CENTRE FOR ECONOMIC RESEARCH

WORKING PAPER SERIES

2001

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A Comment

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WP01/18

September 2001

DEPARTMENT OF ECONOMICS

UNIVERSITY COLLEGE DUBLIN

BELFIELD DUBLIN 4

“MINIMUM WAGES FOR RONALD McDONALD MONOPSONIES: A THEORY OF MONOPSONISTIC COMPETITION”
by V. Bhaskar and Ted To

A COMMENT BY

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Abstract
Bhaskar and To (1999) develop a model of monopsonistic competition and solve explicitly for equilibrium. While a minimum wage set just above the unconstrained optimum leads firms to increase employment it also causes firm exit as profits fall. In this note I show that the employment and welfare effects of the minimum wage which Bhaskar and To had thought to be ambiguous when firm exit was accounted for are in fact unambiguously positive.

JEL classification: J42, J30
Keywords: Monopsony, minimum wage, employment

[1] I am grateful to V. Bhaskar for helpful comments on this note. Any errors are mine.

Introduction

In their (1999) Economic journal paper V. Bhaskar and Ted To (BT from now on) develop a model of monopsonistic competition in the labour market. An important contribution of the paper is that it models firms competing for workers in equilibrium. This allows BT to model the employment and welfare effects of a minimum wage not only in the short run as other models had done (eg. Card and Krueger (1995), Manning (1995) or Rebitzer and Taylor (1995) but also to explicitly model the employment and welfare effects of firm exit. I show in this note that a minimum wage set just above the unconstrained optimum will unambiguously raise employment and welfare both in the short run and the long run. The employment and welfare consequences of the minimum wage were taken to be ambiguous in the original BT model. The results here are derived with a more general production function than in the original BT formulation. Another interesting feature of the derivation below is that we see that the employment effects of the minimum wage for an individual firm is the same in partial equilibrium as in general equilibrium where the effects of other firms wages and firm exit are accounted for.

I. The Model

I begin with a general Monopsony model of the labour market. There are n Monopsonistic firms who are price takers on the output market and have the following profit function:

$$\Pi = PF(L^i[w^1..w^n,n]) - w^i L[w^1..w^n,n] - C \qquad \text{(I.1)}$$

F(.) is a well behaved production function and the firms labour supply curve has the following properties:

$L^i_{w^i} > 0$, $L^i_{w^i w^i} \le 0$, $L^i_{w^j} \le 0$ where $j \ne i$ and finally $L^i_n < 0$.

There is free entry of firms who must pay fixed costs C to enter the industry. Firms choose the wage that maximise profits satisfying their first order condition :

$$p_{w^i} = 0 \qquad \text{(I.2)}$$

A minimum wage imposed just above the equilibrium level will have the following impact on profits of any firm i in the long run:

$$\frac{dp^i}{dw} = \sum_{j \ne i} p^i_{w^j} + p^i_n \frac{dn}{dw} = 0 \qquad \text{(I.3)}$$

The derivative of profits with respect to the firms own wage will be zero since (1.2) holds. The change in other firms wage in response to the minimum wage will affect the firm's profit as will changes in the number of other firms. In the long run firm exit will ensure that the total impact on profits is zero and fixed costs can be covered.

We can take the partial derivatives in (I.3) from the profit function:

$$\sum_{j \ne i} p^i_{w^j} = \sum_{j \ne i} (PF^i_L - w^i) L^i_{w^j} \qquad \text{(I.4)}$$

$$p^i_n = (PF^i_L - w^i) L^i_n \qquad \text{(I.5)}$$

Using these derivatives (I.3) implies:

$$-L^i_n \frac{dn}{dw} = \sum_{j \ne i} L^i_{w^j} \qquad \text{(I.6)}$$

Initially we will look at the impact of the minimum wage on employment in an individual firm, accounting for the impact of firm exit on employment within the firm. Differentiating the firms labour supply function with respect to wages and using (I.6) we get:

$$L_w^i(w^1..w^n,n) = \sum_{j=1}^{n} L_{w^j}^i + L_n^i n_w = L_{w^i}^i \qquad \text{(I.7)}$$

The positive impact on firm labour supply of firm exit is offset exactly by the impact on firm labour supply of changes in other firms wages. That is the long run impact on employment of an individual firm is just the partial derivative of the firms labour supply curve with respect to the firms own wage.

Aggregate employment is the product of firms times employment where L^i is employment in any of the identical firms:

$$E = nL(w^1..w^n,n) \qquad \text{(I.8)}$$

Differentiating with respect to the wage and using (I.6) and (I.7) we get:

$$E_w = L_w^i n + n_w L^i = L_{w^i}^i n - (\sum_{j\neq i} L_{w^j})\frac{L^i}{L_n^i} \qquad \text{(I.9)}$$

Or in a symmetric equilibrium where each firm starts at the same wage and employment combination (w,L):

$$E_w \frac{w}{E} = L_{w^i}\frac{w}{L} - \frac{(\sum_{j\neq i} L_{w^j}\frac{w}{L})}{e_n} = e_{w^i} - \frac{\sum_{j\neq i} e_{w^j}}{e_n} \qquad \text{(I.10)}$$

Where e_{w^i} is the labour supply elasticity of any firm with respect to its own wage, e_{w^j} is the elasticity with respect to other firms wages and e_n is the elasticity of a firms labour supply with respect to the number of firms. These last two elasticities are negative.

Bhaskar and To (1999) develop a model of monopsonistic competition where the n firms are equidistantly spaced around a unit circle. A unit mass of zero reservation wage workers is uniformly distributed on the circle. A mass of m workers who have a positive reservation wage v are also uniformly distributed on the circle. Workers face a transport cost t times the distance to any firm if they wish to work for this firm. BT motivate these transport costs as preferences for a variety of firm specific characteristics. A firms labour supply curve in this model is:

$$L_i = \frac{1}{n} + (1+2m)[\frac{w^i}{t}] - \frac{w^j - 2vm}{t} \qquad \text{(I.11)}$$

Noting that in this case $\frac{1}{e_n} = -nL$, the elasticity of employment with respect to the minimum wage (I.10) can be rewritten as:

$$E_w \frac{w}{E} = L_{w^i} \frac{w}{L} + \frac{(\sum_{j \neq i} L_{w^j} \frac{w}{L})}{} = (1+2m-nL)\frac{w}{tL} \qquad \text{(I.12)}$$

(I.12) is positive since the measure of the labour force $1+m$ cannot be exceeded by employment nL.

If demand is high enough relative to transport costs, fixed costs and v firms compete for both types of labour we would modify the above labour supply appropriately. The only Nash equilibrium is where each firms employment is $\frac{1+m}{n}$ and there is full employment. In this case the wage exceeds the marginal product and the minimum wage would have no impact on employment (see Kiefer and Neumann (1991) for a similar example to this).

In this economy there are firms and workers. Firms earn no surplus in equilibrium since there is free entry. Welfare is therefore just the sum of workers utility. Clearly therefore if the minimum wage increases employment, welfare also increases.

Next I apply the analysis to the particular case analysed by BT where they assumed a constant marginal product f and solve there model explicitly. In particular they show in their appendix that the sign of the following expression determines the sign of employment:

$$\frac{2\sqrt{ct}}{\sqrt{1+2m}} - (f - v) \qquad \text{(I.13)}$$

Given the expression for optimal employment L^* and the optimal number of firms n^* derived in the appendix to BT it can be shown that if employment is less than the labour force ($1 + m > n^* L^*$) then the following condition holds:

$$\sqrt{ct} > \frac{2(1+2m)\sqrt{1+2m}}{3+4m}(f - v) \qquad \text{(I.14)}$$

Inserting (I.14) in (I.13) we get the following expression which is positive:

$$\frac{1+4m}{3+4m}(f - v) > 0 \qquad \text{(I.15)}$$

The positive sign implies that the employment effect of the minimum wage is positive.

II. Conclusion

This note shows that a minimum wage unambiguously raises welfare and employment in the model of monopsonistic competition developed by Bhaskar and To (1999). There remain other arguments against minimum wage policies. A monopsony model may not be the appropriate model of the labour market or of some sectors of the labour market. Even if it is the appropriate model there may be varying degrees of monopsony power across sectors implying that choosing appropriate minimum wages may be difficult (see Stigler (1946)). Walsh (2000) shows in a monopsony model that when labour supply depends on endogenous working conditions as well as the wage that a minimum wage may reduce employment and welfare and that an employment subsidy will be a more effective policy.

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